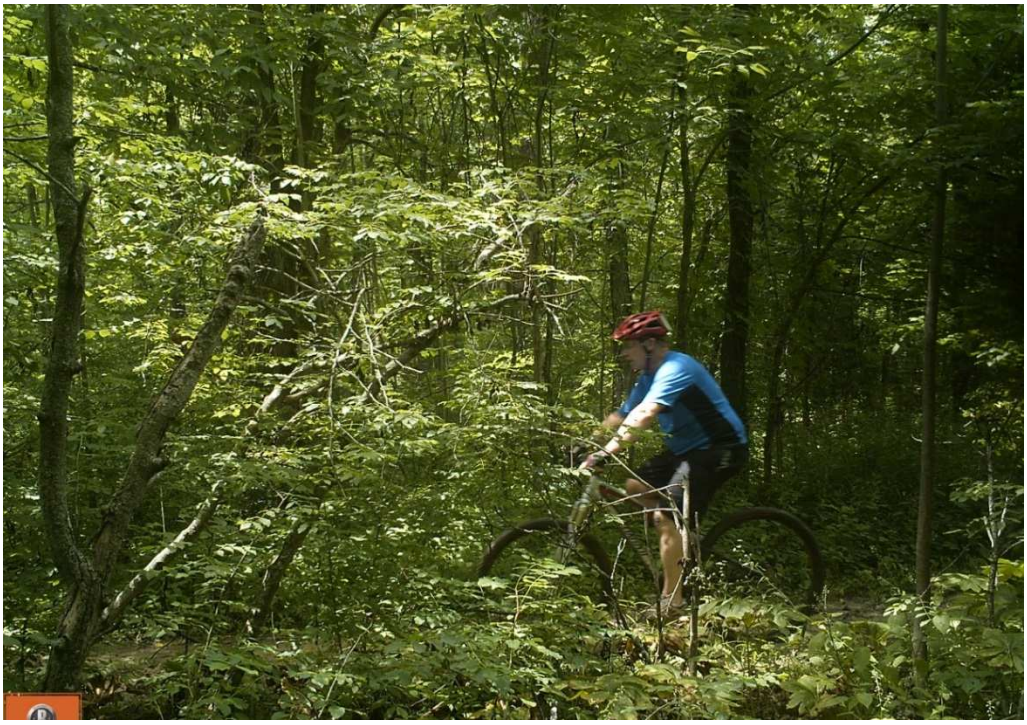
SLEEPY HOLLOW STATE PARK

TRAIL USE STUDY

2013-2014

Michigan Department of Natural Resources
Parks and Recreation Division

SLEEPY HOLLOW STATE PARK TRAIL USE STUDY



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1. Introduction

Sleepy Hollow State Park is located in eastern Clinton County, in the center of Michigan's Lower Peninsula. The park features scenic trails through forests and fields and around Lake Ovid. Just 20 minutes north of Lansing, Sleepy Hollow offers a quiet retreat from the capitol city bustle. The park offers 181 modern campsites, a group youth area, swimming beach, boat launch, a recently completed modern cabin and approximately 23 miles of hiking, biking, and equestrian trails. Sleepy Hollow State Park offers year-round activities and events, making it the perfect retreat for Tri-County residents and visitors.

Sleepy Hollow State Park was created in the 1960's by damming the Little Maple River to form a man-made lake from farmland, in an area of Michigan where inland lakes were scarce. This was part of a state-wide initiative under the State Lakes Program. In the early 1960's the Lansing area was one of the few locations in Michigan without lakes and natural areas available for public recreation.

2. Purpose of Study

The purpose of this study is to gain a better understanding of the existing trail system and how it is being used at Sleepy Hollow State Park, including the trail use levels, user types and any problems with the system. This will be used as background information for the park General Management Plan process, which is scheduled to begin in 2015. This study, along with the General Management Plan, will provide information to guide park managers for the future of the park.

The need for additional information on the trails at Sleepy Hollow State Park was highlighted in part by a request by the Sleepy Hollow Trail Riders Association (SHTRA) to expand the equestrian trail system in the northern area of the park known as the north ridge trail. The Michigan Department of Natural Resources (DNR) Parks and Recreation Division (PRD) denied the request in June 2013 citing concerns over the density of the existing trails within the park, and the resulting lack of undisturbed area for wildlife and other dispersed recreation opportunities, such as hunting.

This study was undertaken by Debbie Jensen, Park Management Plan Administrator and Matt Lincoln, Planning Analyst, with assistance from Jeff Johnson, seasonal planning assistant. Student interns Melanie Nieske and Kelly Shinabarger were responsible for logging the data, generating many of the graphs and assisting with the draft plan. Park staff were also instrumental in assisting with locating and maintaining the cameras in the field.

3. Methods

Beginning in early November 2013, cameras were installed on three key trail segments in the northern part of the park, where the majority of trail miles are located. The pictures captured were used to determine trail use numbers and user type over a period of twelve months. The trail points were selected to include hiking/equestrian, hiking/mountain bike and multi-use trails. Camera 1 was positioned along a short section of shared horse/bike trail in a wooded area west of the equestrian staging area. Camera 2 was positioned to view the intersection of a shared horse/bike trail and a bike trail. Camera 3 was positioned on the main multi-use trail that runs around the west side of the lake. This is a paved trail (formerly the park road) that allows for all non-motorized uses. A hiking/bike trail crossing the multi-use trail was also captured by this camera. A map showing the location of the cameras follows.

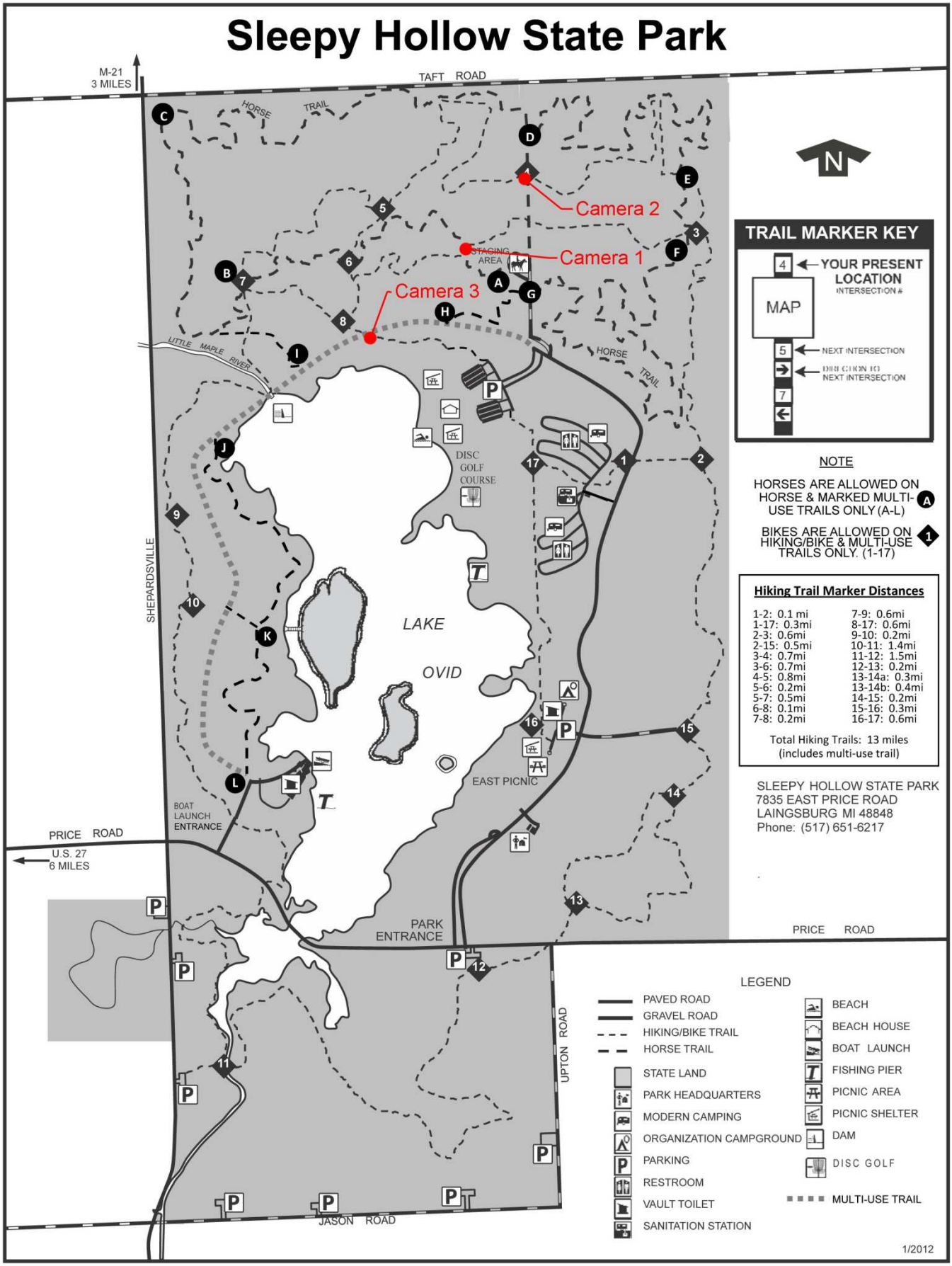
A Bushnell HD Trophy Cam (Model #119537) was selected as the best camera model for trail analysis at Sleepy Hollow. Justifications for this product included:

- Long battery life
- Infrared or no-glow flash (less conspicuous)
- Fast trigger speed – under 1 second, to capture those travelling at speed
- Fast recovery time – under 3 seconds, to capture individuals in groups
- Long detection range – 60 feet

Although the cameras proved to be reliable, several challenges arose and resulted in some gaps in the data over the one year study period. Common challenges included the following:

- Faulty SD cards resulting in lost data (these were replaced 3 months into the study)
- Extreme low temperatures and heavy snow hindering data collection
- False triggers due to vegetative growth
- Picture quality problems due to vegetative growth blocking the camera
- Incorrect camera angle
- Shortened battery life due to extreme temperatures and/or high amounts of false triggers

To address these challenges, the cameras were checked more frequently and pictures were downloaded in the field so staff were aware of any problems that may exist before returning to the office. In the spring and summer, as vegetative growth became more of an obstruction, park staff increased maintenance in the areas around the cameras.


Sleepy Hollow State Park
M-21
3 MILES
TAFT ROAD
HORSE TRAIL
Camera 2
Camera 1
Camera 3
STAGING AREA
LITTLE MAPLE RIVER
HORSE TRAIL
DISC GOLF COURSE
LAKE OVID
SHEPARDSVILLE
BOAT LAUNCH ENTRANCE
EAST PICNIC
PRICE ROAD
U.S. 27
6 MILES
PARK ENTRANCE
PRICE ROAD
UPTON ROAD
JASON ROAD
N
TRAIL MARKER KEY
4 YOUR PRESENT LOCATION
INTERSECTION #
MAP
5 NEXT INTERSECTION
DIRECTION TO NEXT INTERSECTION
7
NOTE
HORSES ARE ALLOWED ON HORSE & MARKED MULTI-USE TRAILS ONLY (A-L)
BIKES ARE ALLOWED ON HIKING/BIKE & MULTI-USE TRAILS ONLY. (1-17)
Hiking Trail Marker Distances
1-2: 0.1 mi
1-17: 0.3mi
2-3: 0.6mi
2-15: 0.5mi
3-4: 0.7mi
3-6: 0.7mi
4-5: 0.8mi
5-6: 0.2mi
5-7: 0.5mi
6-8: 0.1mi
7-8: 0.2mi
7-9: 0.6mi
8-17: 0.6mi
9-10: 0.2mi
10-11: 1.4mi
11-12: 1.5mi
12-13: 0.2mi
13-14a: 0.3mi
13-14b: 0.4mi
14-15: 0.2mi
15-16: 0.3mi
16-17: 0.6mi
Total Hiking Trails: 13 miles
(includes multi-use trail)
SLEEPY HOLLOW STATE PARK
7835 EAST PRICE ROAD
LAINGSBURG MI 48848
Phone: (517) 651-6217
LEGEND
PAVED ROAD
GRAVEL ROAD
HIKING/BIKE TRAIL
HORSE TRAIL
STATE LAND
PARK HEADQUARTERS
MODERN CAMPING
ORGANIZATION CAMPGROUND
PARKING
RESTROOM
VAULT TOILET
SANITATION STATION
BEACH
BEACH HOUSE
BOAT LAUNCH
FISHING PIER
PICNIC AREA
PICNIC SHELTER
DAM
DISC GOLF
MULTI-USE TRAIL
1/2012

For each camera, pictures were reviewed and the number of users per day was logged by user type. The use types recorded were: equestrian, bike, hike, running, hunting, cross-country skiing and snow shoeing. It was also noted if the users were part of a group and if other unusual circumstances were observed. Towards the end of the study, the number of users accompanied by a dog was recorded. The temperature as noted on the camera was also logged for reference.

For consistency, the following methodology was used to record photos once collected from the field:

- If the same person was viewed in quick succession (i.e. less than 1 minute apart), it was recorded as one encounter.
- If the same person was noted returning on the trail at a longer interval of time, each encounter was recorded.

4. Findings

The data was analyzed by looking for patterns with regards to user type, season and area of the park. Graphs on the following pages illustrate trail use numbers by the primary user types for each camera location.

Trail User Types

The table below illustrates the total trail users by the primary use type logged by each camera. A breakdown of each month's user datasheets can be found in the appendix.

Trail Use by User Type and Camera Location

	Camera 1	Camera 2	Camera 3	TOTAL all cameras
Hike	349	720	2596	3665
Equestrian	371	761	456	1588
Run	58	202	986	1246
Bike	100	227	561	888
Hunter	77	237	68	382
XC Ski	48	51	86	185
Snowshoe	1	3	3	7
TOTAL all users	1004	2201	4756	7961

Overall, hiking is the most prominent trail use at Sleepy Hollow (at 46%) followed by equestrian use (20%). If all self-propelled uses are combined; hiking, running, cross-country skiing and snowshoeing, this accounts for 64% of the trail use. Of the hikers, approximately one third of them were accompanied by dogs (based on data from August through October 2014) and the majority of hikers were in a group of two or more persons. Some of the more unusual trail uses captured included dog sleds, horse and cart, and snowmobiles. It should be noted that there were several events that impact the trail use: the Legend run in August and several SHTRA events throughout the year.

As expected, the cameras also documented a variety of the wildlife in the park. This included frequent deer sightings at all three cameras, fox, raccoon, squirrel, rabbit, turkey, a pheasant, and several other bird species.

Season

A change in use patterns for all of the cameras was clearly evidenced by season. The following table shows the top two uses by season for each camera. Fall use was primarily dominated by hikers, while the month of November saw increased hunting use fueled by firearm deer season. During the month of November, hunters represented 90% of the use at camera 1 and 70% of use at camera 2. Equestrian use dominates through the summer months in the wooded areas of the park.

Top two uses by season for each camera

	Winter	Spring	Summer	Fall
Camera 1	1. XC Ski	1. Hike	1. Equestrian	1. Equestrian
	2.Hunt	2. Equestrian	2. Hike	2. Hike
Camera 2	1. XC Ski	1. Hike	1. Equestrian	1. Hike
	2. Hike	2. Equestrian	2. Hike	2. Hunt
Camera 3	1. Hike	1. Hike	1. Hike	1. Hike
	2. XC Ski	2. Bike	2. Run	2. Bike

Note: for this table the seasons were defined as follows:
Winter December – March; Spring April – May; Summer June – August; Fall September - November

Use generally decreases in December through March with the primary uses of cross country skiing, and snowshoeing. Limited snowmobile activity was also observed. It should be noted that the winter of study included particularly harsh weather conditions with record low temperatures, heavy and frequent snow and an ice storm resulting in many fallen branches blocking trails.

Spring months of April and May were dominated by hikers. Also in spring and early summer, equestrian use is at its peak; trailing off in the hotter months of July and August.

Summer months of June through August saw high equestrian numbers, with peak use in June. Biking also saw increased use during the summer months. Another environmental factor to consider is the high occurrence of mosquitos in the wooded areas (cameras 1 and 2) during the early summer which may have contributed to use patterns during this season.

Location

Use patterns varied from camera to camera based on the location. The multi-use trail, where camera 3 was located, showed the heaviest use year round. The total number of users on this trail was double the amount of camera 2 and 4 times the amount of camera 1. The observations from camera 3 indicate that the majority of the trail users were coming from the day-use beach area where the main parking lot is located and possible from the camp site through the day-use area. A large number of family groups were noted, especially though the summer months, most likely campers staying at the park. The paved surface and open character of the trail also attracts less adventurous users and does not experience conflicts with hunters in the winter months and mosquitoes in the summer. This location was also the most popular for bikers, hikers and runners and showed many regular users.

Camera 2 was located on the northern end of the park where a bike trail crosses a horse/bike trail (old road bed). This location was the second most popular of the three, illustrating the highest numbers of equestrian users and hunters.

Camera 1 was located at the west end of the equestrian staging area. Although its proximity to the staging area was closer than the camera 2 location, camera 2 documented twice as many equestrians than camera 1. It should be noted however, that camera 1 experienced the most errors resulting in lost data, which would account for some of the difference in recorded use.

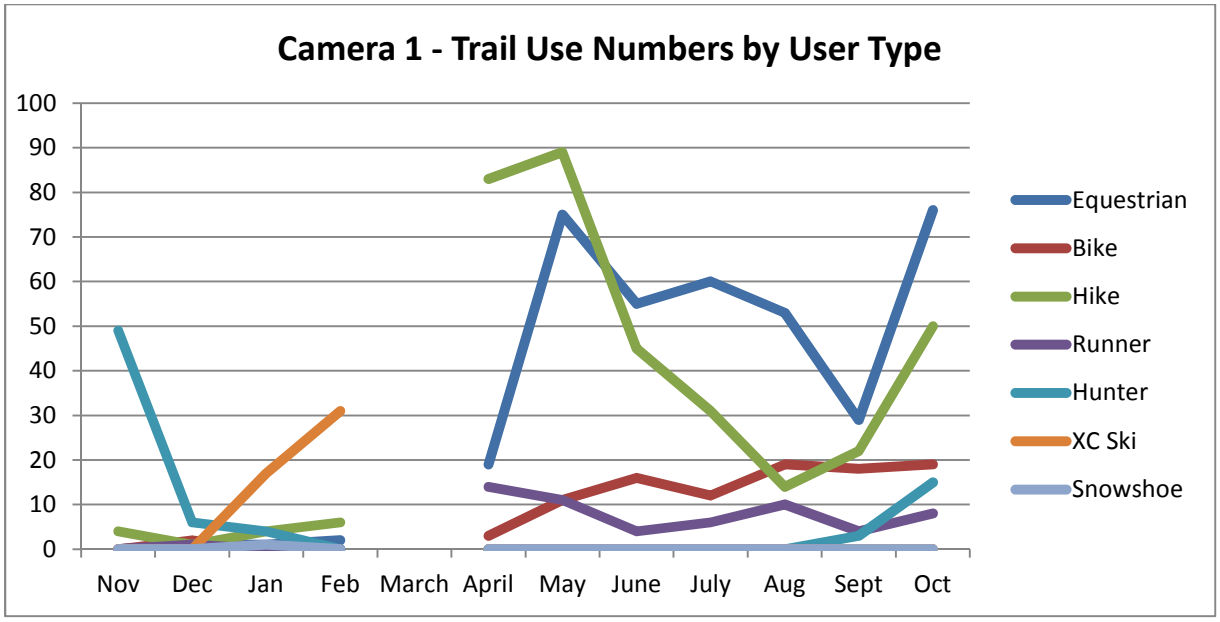
5. Conclusions and Recommendations

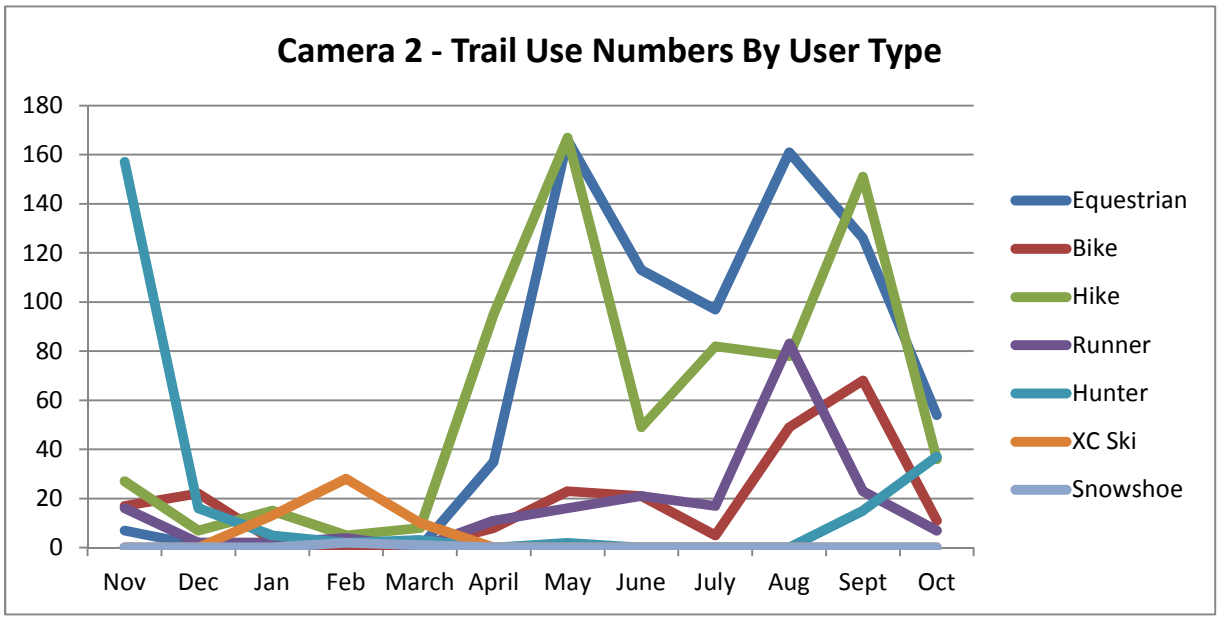
The findings of this study indicate that the trails at Sleepy Hollow State Park are used throughout the year and accommodate a range of users, varying from season to season. Trail use is a popular recreation activity at the park and there was no indication from the study of conflicting uses or over-use of the trail. The hierarchy of the trails, from paved to two-track to single track, accommodates a range of users. Hiking is the most popular use however, and it should be noted that although all trails are open to hiking, there are no "hiking only" trails at Sleepy Hollow State Park.

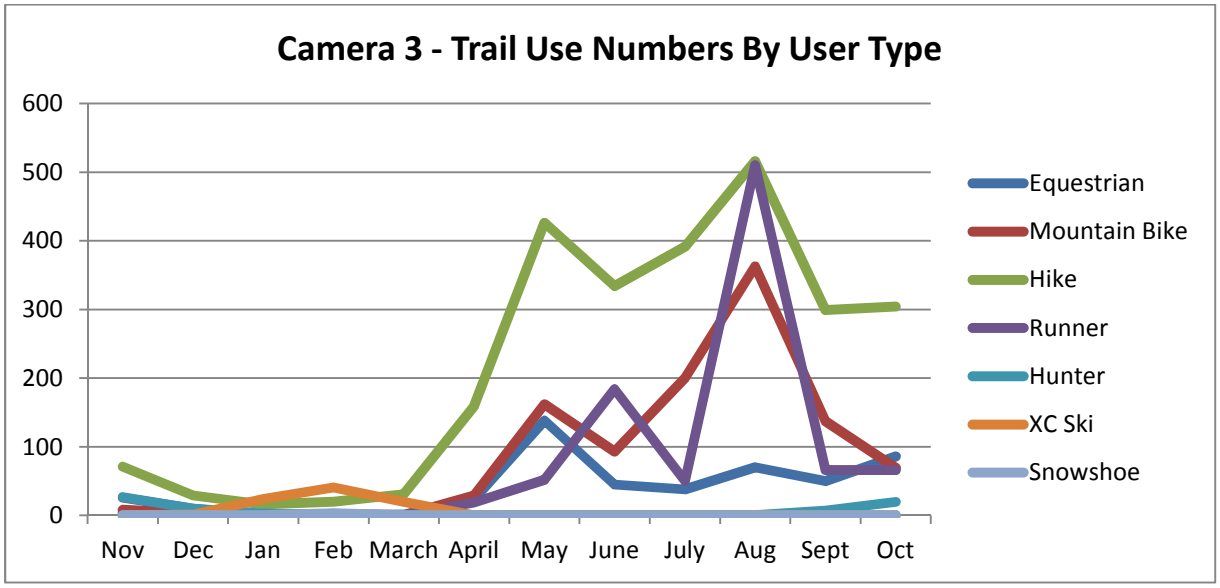
The following recommendations are made based on the observations:

- Ensure that all mapping and data pertaining to the trail system is correct. There are currently discrepancies between maps, markers on the ground and digital media.
- During the firearm deer season it was noted that some trail users were not wearing the recommended Hunter Orange, especially mountain bikers. Additional education may be required to alert all users that the park is open to hunting.
- Consider groomed cross-country ski trails to accommodate winter use.
- Install additional distance markers to assist runners and others using the park for exercise and fitness.
- Consider providing specific facilities and amenities to accommodate the many dog owners that use the park on a frequent basis.

The primary purpose of this study was to inform the park Management Plan which is scheduled to begin in 2016. It is recommended that this study be repeated in five years (when the Management Plan will be due for review) to monitor any changes in use patterns. This data forms a base model for similar parks across the system and will help to inform management decisions based on hard data.


Camera 1 - Trail Use Numbers by User Type
100
90
80
70
60
50
40
30
20
10
0
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Equestrian
Bike
Hike
Runner
Hunter
XC Ski
Snowshoe


Camera 2 - Trail Use Numbers By User Type
180
160
140
120
100
80
60
40
20
0
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Equestrian
Bike
Hike
Runner
Hunter
XC Ski
Snowshoe

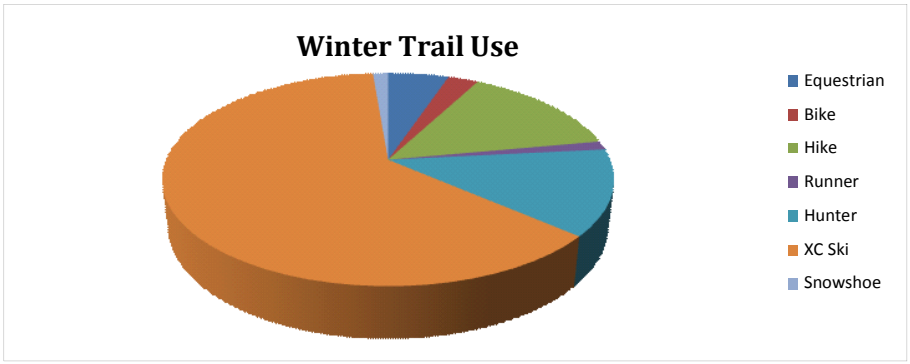

Camera 3 - Trail Use Numbers By User Type
600
500
400
300
200
100
0
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Equestrian
Mountain Bike
Hike
Runner
Hunter
XC Ski
Snowshoe

APPENDIX A

Camera #1

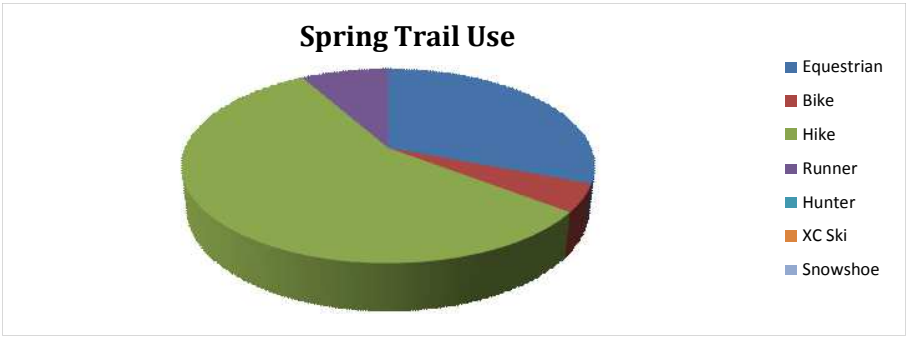
December - March	
Winter Use	
Equestrian	4
Bike	2
Hike	11
Runner	1
Hunter	10
XC Ski	48
Snowshoe	1
TOTAL	77

*No data from 2/20 to 4/2 due to camera error



Camera #1

April - May	
Spring Use	
Equestrian	94
Bike	14
Hike	172
Runner	25
Hunter	0
XC Ski	0
Snowshoe	0
TOTAL	305



Camera #1

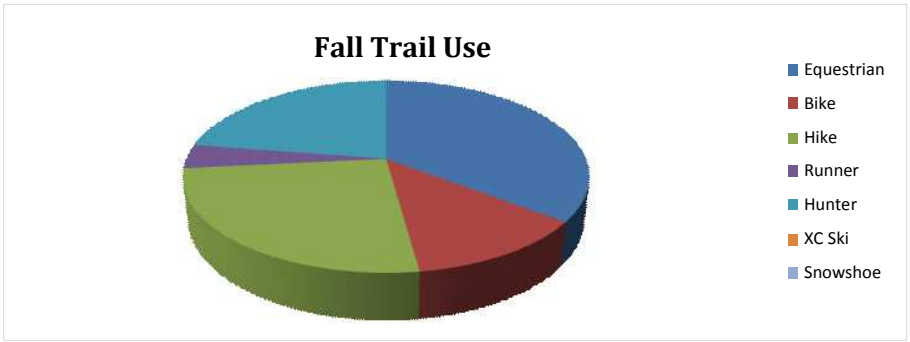
June-August	
Summer Use	
Equestrian	168
Bike	47
Hike	90
Runner	20
Hunter	0
XC Ski	0
Snowshoe	0
TOTAL	325

*No data from 7/26 to 8/20 due to camera error

Camera #1

September - November	
Fall Use	
Equestrian	105
Bike	37
Hike	76
Runner	12
Hunter	67
XC Ski	0
Snowshoe	0
TOTAL	297

*No data from 9/5 to 9/25 due to camera error



TOTAL Equestrian	371
TOTAL Bike	100
TOTAL Hike	349
TOTAL Runner	58
TOTAL Hunter	77
TOTAL XC Ski	48
TOTAL Snowshoe	1
GRAND TOTAL	1004

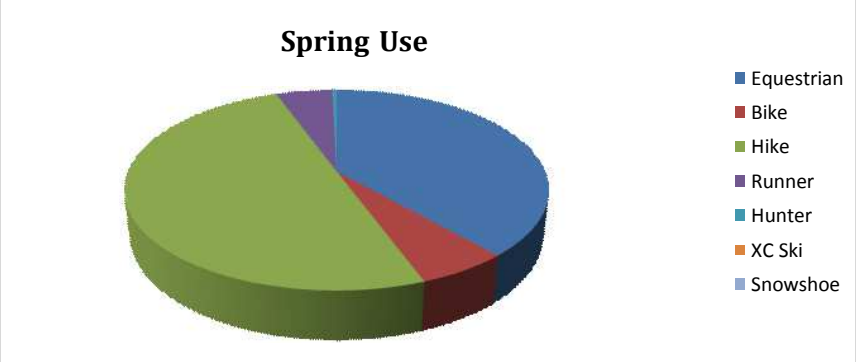
APPENDIX A

Camera #2

December - March	
Winter Use	
Equestrian	2
Bike	25
Hike	35
Runner	8
Hunter	26
XC Ski	51
Snowshoe	3
TOTAL	150

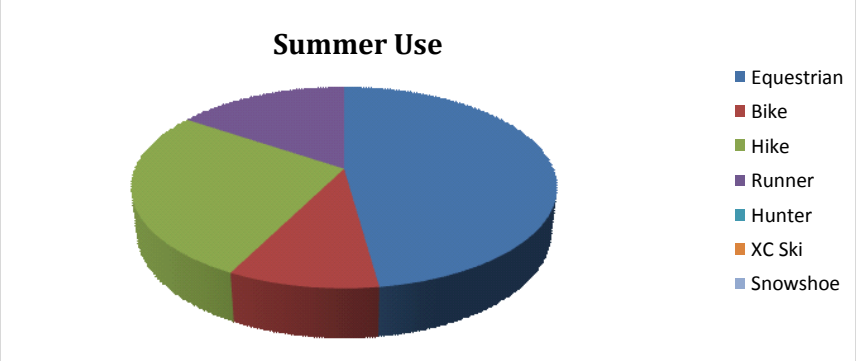
Camera #2

April-May	
Spring Use	
Equestrian	201
Bike	31
Hike	262
Runner	27
Hunter	2
XC Ski	0
Snowshoe	0
TOTAL	523



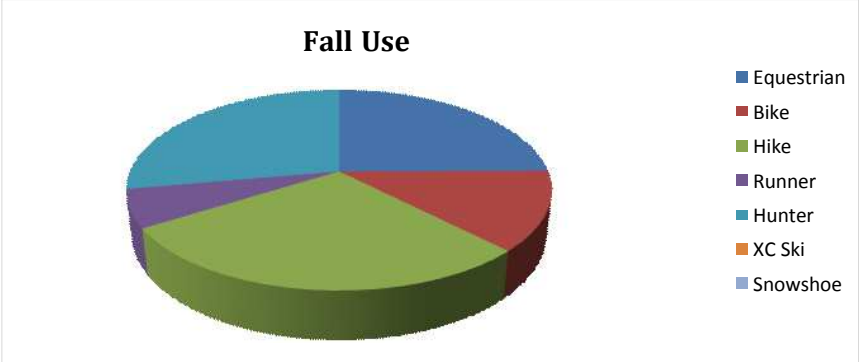
Camera #2

June- August	
Summer Use	
Equestrian	371
Bike	75
Hike	209
Runner	121
Hunter	0
XC Ski	0
Snowshoe	0
TOTAL	776



Camera #2

September - November	
Fall Use	
Equestrian	187
Bike	96
Hike	214
Runner	46
Hunter	209
XC Ski	0
Snowshoe	0
TOTAL	752



TOTAL Equestrian	761
TOTAL Mtn. Bike	227
TOTAL Hike	720
TOTAL Runner	202
TOTAL Hunter	237
TOTAL XC Ski	51
TOTAL Snowshoe	3
GRAND TOTAL	2201

APPENDIX A

Camera #3

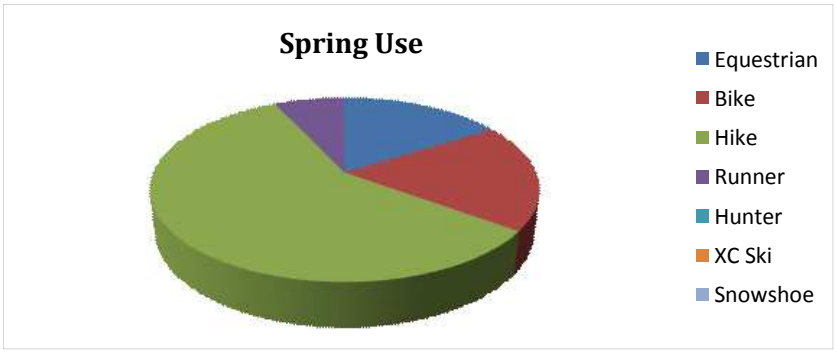
December - March	
Winter Use	
Equestrian	1
Bike	3
Hike	96
Runner	13
Hunter	14
XC Ski	86
Snowshoe	3
TOTAL	216

*No data from 12/18 to 1/9 and 3/22 to 3/31 due to camera error

Camera #3

April-May	
Spring Use	
Equestrian	162
Bike	191
Hike	585
Runner	71
Hunter	0
XC Ski	0
Snowshoe	0
TOTAL	1009

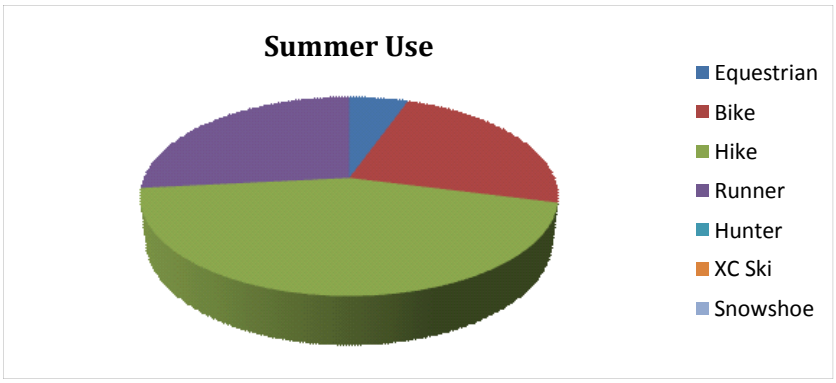
*No data from 4/1 to 4/20 due to camera error



Camera #3

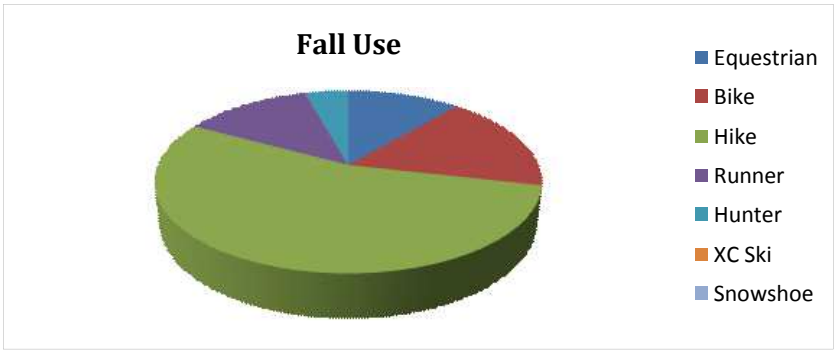
June-August	
Summer Use	
Equestrian	153
Bike	656
Hike	1241
Runner	744
Hunter	0
XC Ski	0
Snowshoe	0
TOTAL	2794

*No data from 6/12 to 6/25 due to camera error



Camera #3

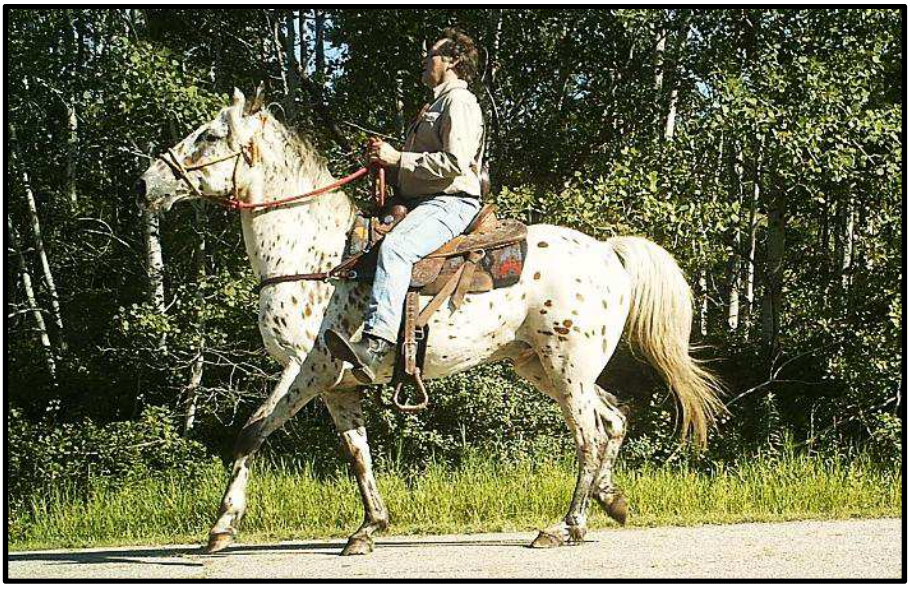
September - November	
Fall Use	
Equestrian	140
Bike	214
Hike	674
Runner	158
Hunter	54
XC Ski	0
Snowshoe	0
TOTAL	1240



TOTAL Equestrian	456
TOTAL Bike	561
TOTAL Hike	2596
TOTAL Runner	986
TOTAL Hunter	68
TOTAL XC Ski	86
TOTAL Snowshoe	3
GRAND TOTAL	4756

APPENDIX B

APPENDIX B



APPENDIX B